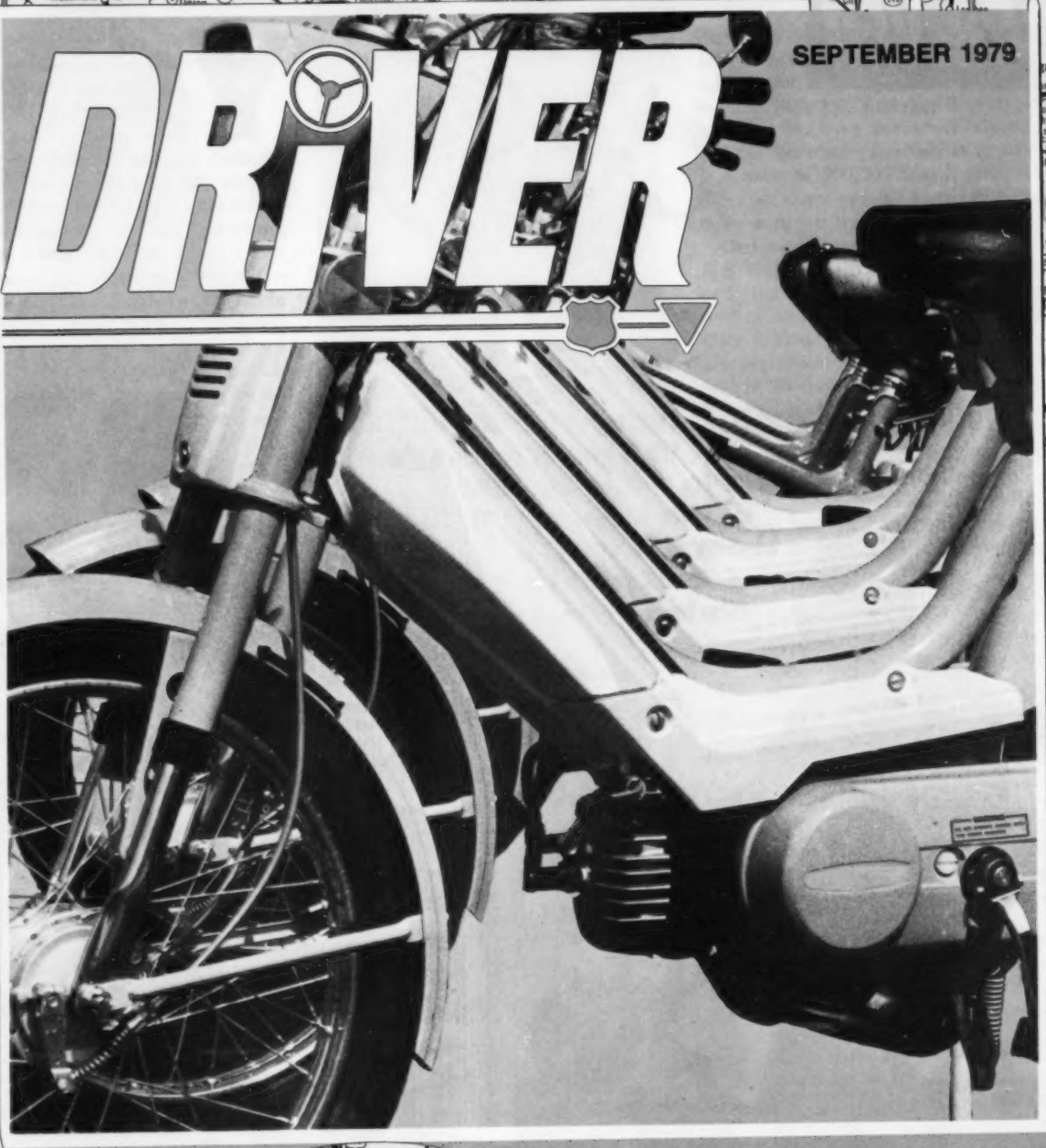
DRIVER

SEPTEMBER 1979



it's moped time!

100 miles per gallon!

DRIVER

We've found that: a) they're selling like mad, b) they're simple to maintain, and c) the laws regulating them are very different from state to state.

You may remember last year we printed an article on mopeds ("Soft Pedaling," May 1978 DRIVER), those little motorized two-wheelers that are a hybrid between a bicycle and a motorcycle. We were curious to see if their popularity is growing as much as we had predicted. And it looks very much like it is.

We talked to the Moped Association of America (MAA) and they gave us some interesting facts. Take these figures as an example. In 1975 there were about 50,000 of the little vehicles across the country. Their owners had brought them in from other countries. In 1975 dealers in the U.S. started selling mopeds; that year they sold 25,000. In 1976, they sold 75,000. In 1977,

A moped is pretty simple to maintain. All you need is a few tools and a little time. Your owner's manual will provide most of the information you need.

it's moped time!

they sold 150,000, and in 1978 they sold 250,000. MAA estimates 350,000 will be sold in 1979. That would make the total 900,000. And they'll probably reach it because there are already 750,000 on American roads as of July.

A total of 900,000 would make 18 times as many mopeds in the U.S. as there were just five years ago.

Demand for mopeds sometimes outruns supply. They are selling so well, in fact, that some dealers occasionally sell out their stock and have to wait for more to be shipped in, and some dealers are pre-committed – the vehicles are spoken for before they even arrive in the showroom.

Forty different companies manufacture mopeds, including two U.S. companies, AMF and Columbia. These 40 manufacturers make over 100 different models. Vespa has seven, Peugeot has three and AMF makes two.

These include low-priced models, selling for an average of $400, medium priced ones for around $510, and "luxury" mopeds which go for about $630. MAA says the low-priced models and the luxury models are selling the best. The low ones sell because people grab them up to avoid the high cost of operating a car. The high-priced models increase in sales as the average age of the buyer (and therefore his buying power) increases. The MAA expects the medium-price mopeds to catch up to the others as the buyers of low-price models "trade up."

All these statistics and figures may or may not impress you. Here's one that will, we're sure: Mopeds get over 100 miles to the gallon, some as much

continued

DRIVER

THE
TRAFFIC SAFETY MAGAZINE
FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

Lt Gen HOWARD M. LANE
The Inspector General, USAF

Brig Gen GARRY A. WILLARD, Jr.
Director
Aerospace Safety USAF

PUBLISHED MONTHLY IN COOPERATION
WITH
THE DEPARTMENT OF THE ARMY
AND
THE DEPARTMENT OF THE NAVY

Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM W.B. WARWICK
Commander
Naval Safety Center

AFRP 127-1
Controlled Circulation Permit number
USPS 448-630

SUBSCRIPTION – DRIVER is available on subscription for $12.00 per year domestic ($1.00 per copy); $15.00 per year for foreign mailing ($1.25 per copy), through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Back issues are not available. Changes in subscription mailings should be sent to the above address. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. No payment can be made for manuscripts submitted for publication. Contributions are welcomed, as are comments and criticism. Address all correspondence to the Editor, DRIVER Magazine, AFISC/SEDD, Norton AFB, CA 92409.

ATTENTION DEPT OF THE NAVY PERSONNEL: Address all queries concerning distribution to NAVSAFECEN, NAS, NORFOLK, VA 23511, Attn: Safety Publications Dept. All other correspondence will be welcomed by the Editor.

The contents of this magazine are informative and should not be construed as regulations, technical orders, or directives unless stated. Address reprint requests, stating intended use of material, to the Editor. The Editor reserves the right to make any editorial changes in manuscripts which will improve the material without altering the intended meaning.

The inclusion of names of any specific commercial product, commodity, or service in this publication is for information purposes only and does not imply endorsement by the Air Force.

Certain individuals shown in this magazine are not members of the Air Force and are not required to conform to Air Force grooming standards.

SEP

VOLUME 13 NUMBER 4

CONTENTS

Features	Page
It's Moped Time!	1
Laws, Laws and More Laws	7
Why Cyclists Should Ride With Traffic	10
Coping With Inexperience	14
Bye, Bye Driving	18
Back To School	19
Almost Anyone Can Fix A Car	20
Some Answers for Parents of Teenagers	21
What A Reduction In Speed Saves The Average Driver	Back Cover
Departments	
Double Clutch	2
How It Happens	13
The Backyard Mechanic	22
Backfire	28

COL. WARREN L. BUSCH
Chief, Safety Education Division

VIRGINIA HENDRIX
Editor

SSgt DON HOLT
Technical Editor

JERI ROOD
Feature Editor

ALICE MILKEY
Editorial Assistant

DON KELLEHER
Art Director

LORRAINE HAMBLEN
Staff Artist

CLIFF MUNKACSY
Staff Photographer

THE EDITOR SPEAKS
DOUBLE CLUTCH

READERSHIP SURVEY

As we lock up this issue of DRIVER, our readership survey cards have been in the field about three weeks and so far we have received about 2,000 responses from Air Force readers. We hope to receive many more as the cards begin to arrive from greater distances.

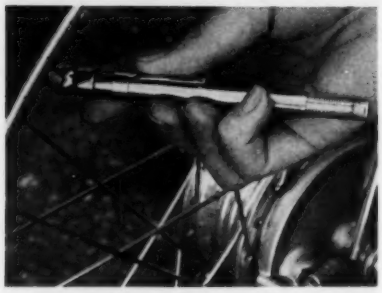
Unfortunately, we couldn't afford to include the survey cards in the June magazines that went to the other Services. It's not that we aren't interested in Army, Navy and Marine opinions, and Coast Guard too, but regulations require us only to survey Air Force readers. Printing those little yellow cards, having them bound into the magazines, and providing for return postage is more expensive than you might think. So, although we are eager to hear from you readers in the other Services, it has to be your paper and stamp!

The staff has been overwhelmed to see the thought that has gone into your responses. You have given us dozens of ideas for future articles. One of the most requested new features is a Question and Answer column, and we will certainly start one soon. We were surprised at the number of you who thought some space should be given to government vehicles. We will try to oblige.

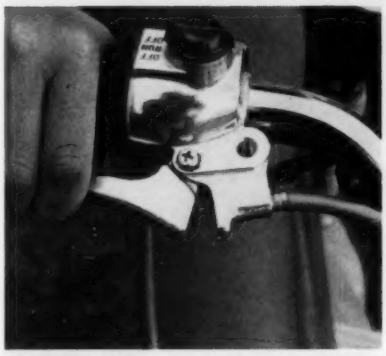
Some comments and suggestions have been repeated so frequently that we want to reply to them here:

Four-color photographs and better paper – Sorry, they're not in the budget. DRIVER is a low-cost publication. Our cost per copy is about 16¢. Last

continued on page 13



Let's take a few items that should be done before every ride. First, there are the tires. These should be inflated to the pressure that will be in the owner's manual or perhaps on a sticker on the moped. The pressure that is correct may vary with the weight of the rider.



Another thing to check is the braking. Mopeds have drum brakes on the front and rear that are controlled by levers on the handlebars. Make sure the levers give the right resistance.

Do you have enough fuel? Remember these take a combination of two-stroke oil *and* gasoline.

Once those are taken care of, you can start the moped and go. First, put the lever on the rear wheel in the locked position. This engages the motor-drive system. The off position is for pedaling alone.

as *200* miles. Imagine getting your usual cruising range of 200 miles, but instead of spending 15 dollars to refill your tank, you spend only *one dollar*.

Okay, so they're economical, and they're selling . . . well, like *oil*. What about their safety record? "Safety Sadistics," a publication of the Arizona Governor's Office of Highway Safety, recently printed a couple of items on this subject. Here's one:

"Moped drivers are less likely to be involved in traffic crashes than are motorcyclists, but when mopeds do crash, the riders' risk of injury is almost identical to that of motorcyclists, according to a recent West German study.

"The injury risk for drivers of motorized two-wheeled vehicles in a crash is at least 10 to 15 times higher than for car passengers. The report said 34 percent of the motorcycle and moped drivers received head injuries and 60 percent sustained leg injuries.

"The report advocated that both moped operators and motorcyclists wear helmets. 'The risk of serious head injuries is double, and critical and fatal injuries three time higher for drivers without helmets.'

"The report also called for more efforts to redesign and eliminate protrusions on vehicle bodies that might pose hazards to cyclists and pedestrians in crashes."

The other item:

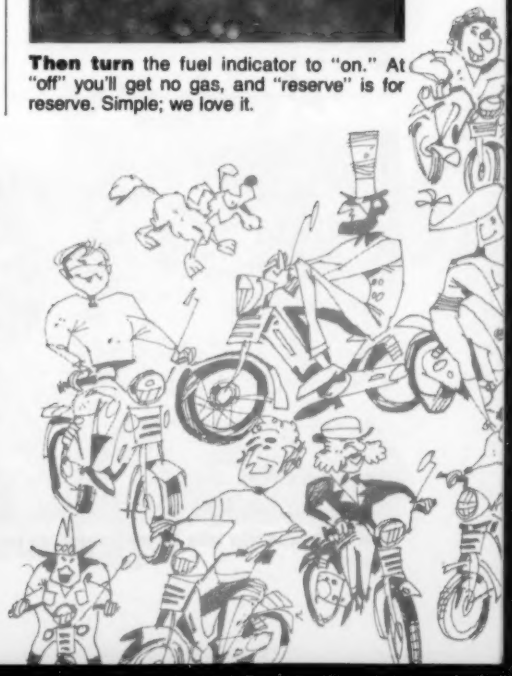
"How dangerous are mopeds?

"Although sales of mopeds are soaring in the United States, there are currently too few moped crashes upon which to obtain an accurate accident picture.

"What little data exists in Europe suggests that the moped falls between the bicycle and motorcycle in terms of a safety problem. Data compiled by the European Conference of Ministers of Transport in 1974 show the death rate per 100,000 vehicles was approximately 8 for bicycles, 51 for mopeds, and 171 for motorcycles.

continued

Then turn the fuel indicator to "on." At "off" you'll get no gas, and "reserve" is for reserve. Simple; we love it.



Next, close the choke. It will open when the throttle is opened fully.

Then comes the ignition key.

And finally this little lever on the right handlebar. Pressing the decompression lever makes it a little easier to push the pedals to start the moped.

Then, with the moped on the stand, you can pedal to start the engine.

Maintenance is simple, too. The spark plug, which we've mentioned, is easy to get to and to remove. Carry a spare plug, and a socket wrench if your moped doesn't come with tools.

Check the nuts on the wheels, if you don't want them to fall. Also check for the presence of the cotter pins and make sure they're bent out of the way.

The carburetor's idle adjustment can be set very easily with a screwdriver.

The headlight should be aimed so that it shines where you're going, and not in the eyes of oncoming drivers.

continued

"At this point, little is known about the U.S. situation. Preliminary research in California shows moped accident and injury patterns resembling those of motorcycles, with a high number of head injuries not typical of bicycle accidents. However, of the 33 states that enacted special moped legislation, only New York has a helmet requirement (this applies only to mopeds with a maximum speed above 20 mph)."

Obviously, this information is not up to date (see the chart elsewhere in this article which shows several other states with helmet requirements), but it gives an indication of what safety people are expecting. We'll pass along anything more we hear.

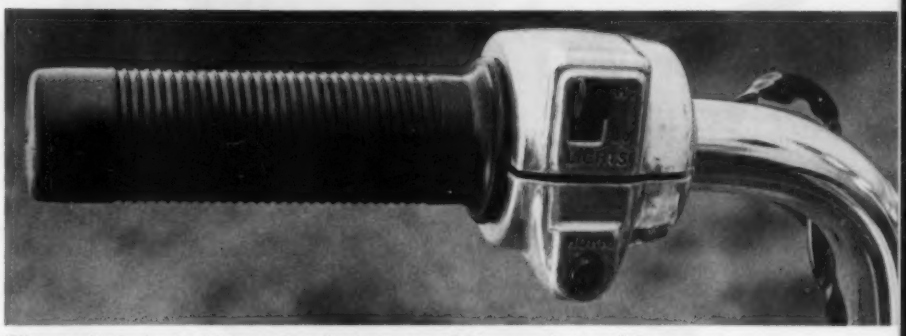
Another thing we wanted to know is how easy they are to maintain. Joe Wolfe, the spokesman for the Moped Association of America, said they're simple to work on, and mostly trouble-free. The owners that we've talked to agree with that.

"Ninety percent of the trouble would be gunked spark plugs," Wolfe said. He personally owns two mopeds and has had only one breakdown in the 1½ years he's had them. This was due to a fouled spark plug, and he simply changed to a spare plug he had and continued on his way.

The spark plug problem will confront all moped owners at some time, Wolfe said. Mopeds have small, low-powered, two-stroke engines, the kind of engines that require a mix of two-stroke oil and gasoline to be used as fuel. With oil in the combustion chamber, the cylinder head and the electrode of the spark plug will eventually be fouled and will need service. Spark plugs can be cleaned fairly easily, but it's a good idea to carry a fresh plug for on-the-road repairs. That way the "out of commission" time is minimized.

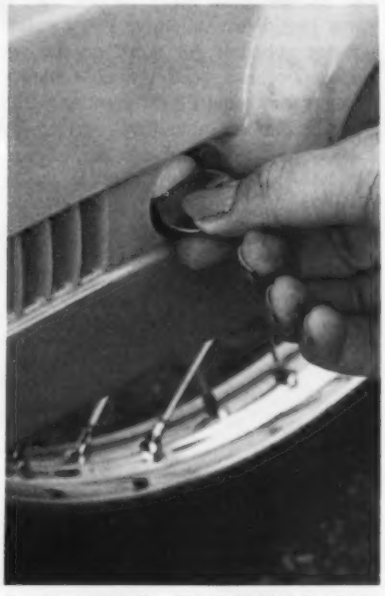
As for the cylinder head, Wolfe says the buildup of carbon eventually causes sluggishness of operation and the cylinder must be cleaned (decarbonized). This process can be accomplished by the backyard mechanic, if he has the tools and the know-how, but the average moped owner should probably leave it to the dealer or shop mechanic.

continued



The controls for the lights, and for the horn, are right here on the handlebars.

Although it may *look* like she's playing the harp, she's actually checking for loose spokes. You can also tap them with a tool. The ones that aren't tight enough will go "thunk." The good ones will go "ting."



Some mopeds, like this Honda, have covers over the chains and stuff. They are easy to remove to get at the works.

continued

The job can usually be done for less than $30, Wolfe said.

Beyond these problems, Wolfe said most of the "maintenance" for a moped can be accomplished with an oil can.

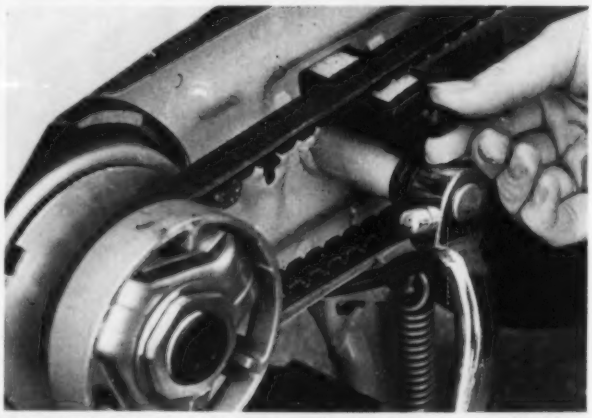
After we talked with Wolfe, we began to wonder what specifically was involved with maintenance on a moped. So we checked around and discovered that they're simpler than motorcycles (by a long way) and almost as uncomplicated as a bicycle.

But rather than just tell you about the maintenance on a moped, we'll show you. We won't give you a maintenance schedule for work on the vehicles, because your moped's manufacturer may require a different schedule than the one we looked at.

This belt must be adequately snug, like the fanbelt on your car.

(We want to thank Honda of Redlands in Redlands, California, for the loan of the moped used in the photos for this article.)

If it needs adjusting, loosen the nuts on the rear wheel and move it until the belt has the right tension.



Mopeds have an air cleaner, too. It's right here, and it should be cleaned periodically.

The chain can be easily adjusted with a wrench. Push the chain idler tight with one hand and tighten the bolt with the other.

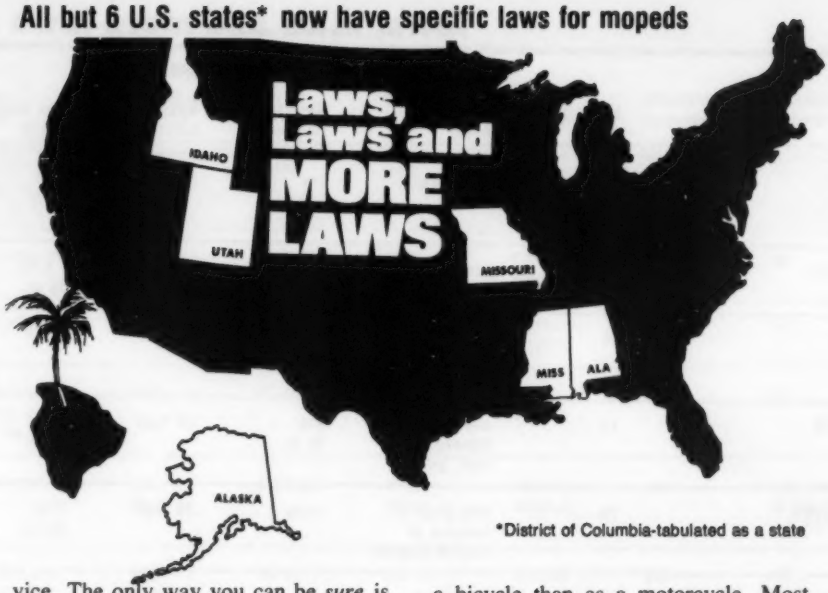
The brakes on this model can be easily adjusted by hand. Just tighten this nut to the proper tension.

Laws affecting the use of mopeds vary widely across the country. The National Committee on Uniform Traffic Laws and Ordinances prepared a 50-page pamphlet comparing these laws in 1978 for the National Highway Traffic Safety Administration. The Committee is preparing a model moped law for NHTSA which should be complete as you receive this issue of DRIVER. We'll wait to see what NHTSA does with it.

We got the accompanying chart from the Moped Association of America. It is current as of August 1979. MAA included this notice with the chart: "Important Notice: The information contained in this publication is collected by the Moped Association of America as a service to its members. Though we have striven for total accuracy, MAA cannot assume responsibility for errors or changes. Please check the motor vehicle bureau in your state for the exact wording and interpretation of laws that affect you."

We want to add our vote to that advice. The only way you can be *sure* is to know the laws of your own state.

One other note: The Air Force is following the lead of some of the states and is considering the moped more as a bicycle than as a motorcycle. Most bases are not requiring the riders to wear helmets. But here again, be sure. Check the base regulations so you don't ride in violation.



STATE-BY-STATE SUMMARY OF MOPED LAWS
as of August, 1979

State	Minimum Age	License Rules	Registra. Require.	Speed Limit	Max Engine Limits	Legal Definition	Mandatory Insurance	Mandatory Helmet
ARIZONA	16	any driver's license	yes $8 yr.	25 mph	1.5 hp 50 cc	pedal bicycle w/ helper motor	no (financial respons.)	no
ARKANSAS	none	none required	none	30 mph	2 hp 50 cc	motorized bicycle	no	no
CALIFORNIA	15	any driver's license; or learner permit	none	30 mph	2 hp	motorized bicycle	no (financial respons.)	no
COLORADO	16	any driver's license	yes $5/3 yrs.	30 mph	2 hp 50 cc	motorized bicycle	no	no
CONNECTICUT	16	any driver's license	none	30 mph	2 hp 50 cc	bicycle w/ helper motor	no	no
DELAWARE	16	any driver's license	yes $5/3 yrs.	25 mph	1.5 hp 55 cc	moped	no	no
DIST. OF COL.	16	any driver's license or mot. bic. p'mit	yes $6 yr.	25 mph	1.5 hp 50 cc	motorized bicycle	no (financial respons.)	no
FLORIDA	15	any driver's license; or learner permit	yes $5 one time	25 mph	1.5 hp	moped	no	no
GEORGIA	15	any driver's license; or learner permit or limited permit	none	30 mph	2 hp 50 cc	moped	no	yes
HAWAII	15	any driver's license; or learner permit	yes $3 yr.	35 mph	1.5 hp 50 cc	moped	no	no

continued

laws, laws and more laws . . .

continued

State	Minimum Age	License Rules	Registra. Require.	Speed Limit	Max Engine Limits	Legal Definition	Mandatory Insurance	Mandatory Helmet
ILLINOIS	16	any driver's license	yes $12 yr.	30 mph	2 hp 50 cc	motorized pedalcycle	no (financial respons.)	no
INDIANA	15	none required	none	25 mph	1.5 hp 50 cc	motorized bicycle	no	no
IOWA	14	any driver's license; or mot. bic. lic.	yes $5 yr.	25 mph	50 cc	motorized bicycle	no (financial respons.)	no
KANSAS	14	any driver's license; or mot. bic. lic.	yes $5 yr.	30 mph	2 hp 50 cc	motorized bicycle	no (financial respons.)	no
KENTUCKY	16	any driver's license; or moped license	none	30 mph	2 hp 50 cc	moped	no	no
LOUISIANA	15	any driver's license	none	25 mph	1.5 hp 50 cc	motorized bicycle	no	no
MAINE	16	any driver's license	yes $5 yr.	30 mph	2 hp 50 cc	moped	no (financial respons.)	no
MARYLAND	16	any driver's license; or moped permit	none	none stated	1.5 hp 50cc	moped	no	no
MASSACHUSETTS	16	any driver's license; or learner permit	yes $3/2 yrs.	25 mph	1.5 hp 50 cc	motorized bicycle	no	no
MICHIGAN	15	any driver's license; or moped license	yes $5 yr.	25 mph	1.5 hp 50 cc	moped	no	no
MINNESOTA	15	any driver's license; or mot. bic. p'mit	yes $3 yr.	30 mph	2 hp 50 cc	motorized bicycle	no (financial respons.)	no
MONTANA	16	any driver's license	none	30 mph	2 hp 50 cc	bicycle	no	no
NEBRASKA	14	any driver's license or learner's permit or school permit	none	30 mph	2 hp 50 cc	moped	no	no
NEVADA	16	any driver's license	none	30 mph	none stated	moped	no (financial respons.)	no
NEW HAMPSHIRE	16	any driver's license	yes $3 yr.	30 mph	2 hp 50 cc	moped	no (financial respons.)	no
NEW JERSEY	15	any driver's license; or mot. bic. lic.	none	25 mph	1.5 hp 50 cc	motorized bicycle	yes	no
NEW MEXICO	13	any driver's license; or restricted lic.	none	25 mph	50 cc	motorized bicycle	no	no
NEW YORK (Class C)	16	any driver's license; or spec. license	yes $5 yr.	20 mph	none stated	limited use class "C" motorcycle	no (financial respons.)	no

State	Minimum Age	License Rules	Registra. Require.	Speed Limit	Max Engine Limits	Legal Definition	Mandatory Insurance	Mandatory Helmet
NEW YORK (Class B)	16	any driver's license; or spec. license	yes $5 yr.	21-30 mph	none stated	limited use class "B" motorcycle	yes	yes
NORTH CAROLINA	16	none required	none	20 mph	1 hp	bicycle with helper motor	no	no
NORTH DAKOTA	14	none required	none	30 mph	2 hp 50 cc	motorized bicycle	no	no
OHIO	14	any driver's license; or mot. bic. lic.	none	20 mph	1 hp 50 cc	motorized bicycle	no	no
OKLAHOMA	none	none required	yes $6 yr.	30 mph	2 hp 50 cc	motorized bicycle	yes	yes for those under 18 yrs old
OREGON (eff. 10/1/79)	16	any driver's license or moped license	yes $6 yr.	30 mph	50 cc	moped	yes	no
PENNSYLVANIA	16	any driver's license	yes $6 yr.	25 mph	1.5 hp 50 cc	motorized pedalcycle	yes	no
RHODE ISLAND	16	any driver's license	yes $10 yr.	25 mph	1.5 hp	motorized bicycle	no	no
SOUTH CAROLINA	12	none required	none	20 mph	1 hp	bicycle with helper motor	no	no
SOUTH DAKOTA	14	any driver's lic.; instruction permit; or restricted p'mit	none	30 mph	2 hp 50 cc	moped	no	no
TENNESSEE	14	any valid license or motorized bicycle license	yes $10.50 yr.	30 mph	2 hp 50 cc	motorized bicycle	no	yes
TEXAS	15	motor assisted bicycle license (written test)	yes $6 yr.	20 mph	60cc	motor assisted bicycle	no	no
VERMONT	16	any driver's license	yes $10 yr.	30 mph	2 hp 50 cc	moped	no (financial respons.)	no
VIRGINIA	16	none required	none	20 mph	1 hp	bicycle with helper motor	no	no
WASHINGTON (eff. 9/1/79)	16	any driver's license	yes $3 yr.	30 mph	2 hp 50 cc	moped	no (financial respons.)	no
WEST VIRGINIA	16	any driver's license	yes $8 yr.	30 mph	2 hp 50 cc	moped	no (financial respons.)	no
WISCONSIN	16	any driver's license	yes $5 yr.	30 mph	50 cc	moped	no (financial respons.)	no
WYOMING	16	any driver's license	none	30 mph	2 hp 50 cc	moped	no	no

Ride

Thousands of people would still be alive today if only they had bicycled on the right side of the road. Wrong-way cycling is more than illegal and stupid – it's a leading cause of bicycle deaths and injuries. And yet so many people do it anyway.

Wrong-way cycling has the appearance of safety to those people. They think, wrongly, that they can see hazards better than cyclists who ride with traffic. This grave mistake, legitimized by daily habit, has been cited by many transportation experts as the single biggest obstacle to a more healthy bicycle-automobile traffic mix in this country.

"It's just madness for bicyclists to ride facing traffic," said Kenneth D. Cross of Anacapa Sciences. "I see little hope that motorists can be taught to scan the left shoulder for wrong-way cyclists."

Cross, author of one of the world's most thorough studies* of bicycle/motor-vehicle collisions, found wrong-way cycling a factor in 17 percent of the 919 accidents studied. And another excellent study,** authored by Allan F. Williams, found wrong-way cycling in 15 percent of the 861 accidents

A Study of Bicycle/Motor-Vehicle Accidents: Identification of Problem Types and Countermeasure Approaches – Volume I, Kenneth D. Cross and Gary Fisher, Anacapa Sciences, Inc., Santa Barbara, CA 93102, 1977. Available through National Technical Information Service, Springfield, VA 22161.

**Study done for the Insurance Institute for Highway Safety in December, 1974.*

"It's just madness for bicyclists to ride facing the traffic."

WITH Traffic

by JOHN SCHUBERT

Reprinted with permission from *Bicycling*

studied. Moreover, Williams found wrong-way cycling a cause of 25 percent of the accidents among cyclists over age 14 – old enough to know better.

In both studies, wrong-way cycling was far and away the biggest single accident cause.

These findings are not supported by accident statistics from Europe. That's not because wrong-way cycling is safe there (or anywhere), though. Europeans, who are much more familiar with the bicycle than Americans, know better than to ride on the wrong side. It's virtually never done there nor tolerated by European police. Police in the United States should be so concerned. In Boulder, Colorado, an active program for enforcing traffic regulations for cyclists met with such scorn and indifference among patrol officers that the police department found it necessary to give each officer a quota of bicycle violations to fill. And in many other U.S. cities, where no such quota system exists, police treat cyclists with not-so-benign neglect.

Dangerous advice: Despite the grim accident reports and the international example, one can still find people purporting to teach bicycle safety by insisting that their students "ride facing traffic." And, worse yet, those people can still find books and brochures which inculcate wrong-way riding with all the authority of the written word. The persons who wrote these deadly books are somehow oblivious to the knowledge that laws in all 50 states require all cyclists to ride on the right.

The motivation for wrong-way riding begins with the widely-held belief that a car, any car at any time, is a threat to the cyclist's safety. Combine this with the fear of the unseen, and the wrong-way cyclist has ample motive for not riding where unseen cars are in a position to (the cyclist fears) hit him or her.

But the whole purpose of traffic laws is to allow road users to rely on the predictability of each other's movements. The cyclist who fears that all cars approaching from behind are likely to be injurious must learn three things:

Participation in traffic demands that the cyclist obey the laws which keep traffic orderly, and that he/she allow and expect other traffic to do likewise.

The laws protect the cyclist most fully when he/she is on the right side of the road.

Riding on the left upsets the orderly pattern. The cyclist is exposed to many more hazards which he/she can't see or hope to avoid.

Hazards are many: What are those hazards? Why is the left shoulder inherently dangerous?

The bicycle is a vehicle. This has both legal and practical implications.

"There has been a lot of misinformation on this issue," said John English, director of research for the National Committee on Uniform Traffic Laws and Ordinances and a well-known authority on bicycles and traffic law. "I suspect this is because people believe the bicycle is like a pedestrian, and they know the pedestrian is supposed to be on the left – but they're wrong.

"Vehicles in this country ride on the right, and the bicycle is a vehicle."

The bicycle shares most attributes of other vehicles (such as automobiles). It goes fairly quickly, can only turn a corner so tightly, needs smooth pavement underneath to function and requires considerable distance to stop; more distance than a car requires at the same speed.

Because of these limitations, the bicycle cannot magically dance out of the way of trouble. If it tries, it may fall right in the path of oncoming traffic. It must follow a path which is least likely to bring it into trouble.

The wrong-way cyclist forces all road users to deal with a hazard coming from a new and unexpected direction.

"The motorist does not expect the bicyclist to be coming from that direction," English said. "Ask any driver education teacher where he teaches people to scan."

Vince Durago, creator of the well-known *Sprocketman,* bicycle safety book, puts it another way:

"The vast majority of bicycle accidents occur because the bicycle's movements are unpredictable," Durago said. "Motorists are getting tricked by wrong-way bicyclists who virtually force them to run them over."

The wrong-way cyclist can do nothing right when he/she reaches an intersection.

There are no rules or legitimate paths for a wrong-way cyclist to follow at an intersection. The cyclist must create an *ad hoc* path to get through the other vehicles' paths. The cyclist can't see motor vehicles with which he/she is on a collision course – such as cars coming from behind to turn left or cars making a right turn towards the cyclist. And those cars can't see the cyclist either.

continued

Any path a wrong-way cyclist picks through an intersection is, by definition, on a collision course with a motorist who had no reason to expect a hazard coming from that direction. When a motorist finally does see a wrong-way cyclist, it may take the motorist a fatal minute to realize in which direction the cyclist is heading.

Should the wrong-way cyclist have to veer out into the roadway, he/she is in much greater trouble than a right-side cyclist.

Frequently occurring hazards such as broken glass, potholes, pavement seams or a disappearing shoulder force a cyclist, no matter which direction he/she rides in, to veer towards the center of the road. If on the left, the cyclist is on a collision course with the next oncoming car, with a closing speed equal to the sum of the bicycle's speed and the car's speed.

Using the modest figures of 15 and 25 mph for the bicycle and car respectively, the wrong-way cyclist approaches the car head-on at 40 mph or 20 yards per second. If the cyclist rides on the right, the closing speed is only 10 mph (five yards per second). Moreover, since kinetic energy varies with the square of the speed, the wrong-way cyclist's potential impact is 16 times as severe as the right-side cyclist's impact. It's the same as the difference between falling from a two-story building and falling from a 30-story building.

The wrong-way cyclist is forced to cross paths with the oncoming car at a moment of neither's choosing.

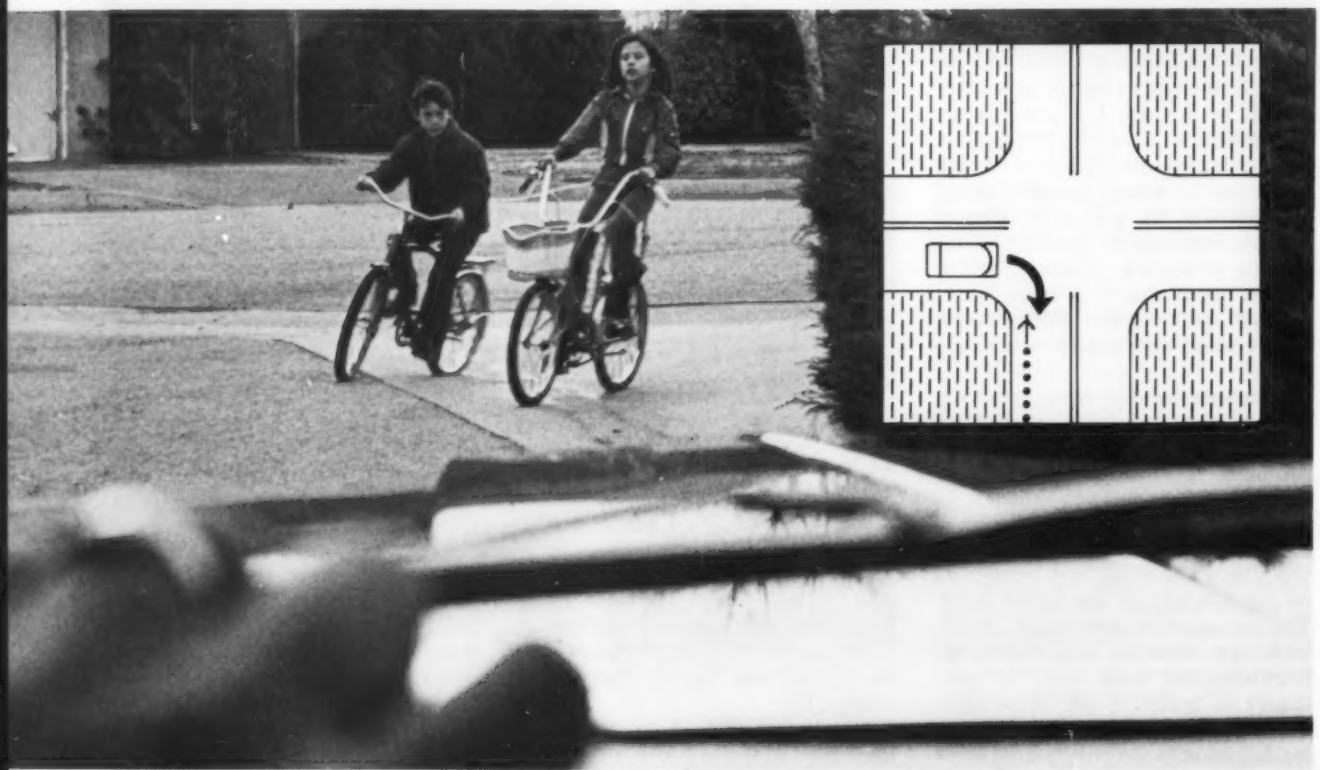
The motorist overtaking a right-side cyclist can follow and wait for a safe moment to pass, whereas the motorist approaching a wrong-way cyclist must cross paths right then, however dangerous a moment that might be.

If the motorist is faced with approaching traffic, especially if he/she faces an oncoming wide load or a car struggling to complete a passing maneuver, the motorist may be forced to veer towards the wrong-way cyclist to avoid the oncoming traffic. To add insult to injury, the greater overtaking speed and opposing directions of the wrong-way cyclist demand greater lateral clearance for safe passage.

Wrong-way cyclists frequently collide with pedestrians and with right-side cyclists.

These accidents often result in broken bones and hospital stays for innocent parties.

Yes, cyclists are sometimes struck from behind when they ride on the proper side of the road, but data from Cross's study tells us this accident type is no excuse for wrong-way cycling. Some 70 percent of those accidents are on narrow rural roads after dark, and one-third of the time the



One of the most frequent accident types which results from wrong-way riding occurs when a motorist makes a right turn towards the wrong-way cyclist. The motorist usually looks only to the left before executing the turn, and in these accidents often collides with the cyclist before even seeing him/her. This is only one of many wrong-way riding accidents found at intersections. To see how wrong-way riding complicates intersection behavior, just ask yourself how this cyclist could possibly make a safe right turn.

motorist is intoxicated.

Cross found that more than half the victims had "rear lighting equipment that met the current lighting standards," but he is one of many researchers who believe these standards are pitifully inadequate. Victims of these accidents were usually very hard to see.

And there's no guarantee that the accident wouldn't occur if the cyclist were facing the other way. Remember, the cyclist usually has no shoulder to ride on and is nearly invisible to the motorist.

There's no question that riding on the right requires maturity, judgment, careful attention and steady nerves on the cyclist's part. It takes practice for a cyclist to become used to the proper role in the traffic mix. But with this practice, the cyclist will learn that motorists who pass on the left are, by training and instinct, ready to allow for and safely pass slow-moving vehicles in the paths. The chances of those motorists hitting the cyclists are quite small – unless the cyclist breaks the rules.

A word of caution: Last month, on an unlit country road in Brookhaven, N.Y., two bicyclists out for evening rides collided head on. One thought he had crashed into a tree, until he woke up in a hospital and was told otherwise. He had a broken vertebra in his neck and was put in traction. The other was in a coma for two weeks before dying.

Police estimated that both were going about 20 mph, a speed on impact of 40 mph. Neither was equipped with a light, neither wore a helmet. Their bikes had reflectors, but there was no available light to be reflected.

Fatalities are rare in such accidents, but bike vs. bike collisions are fairly common. And according to a recent report by the National Electronic Injury Surveillance System of the Consumer Product Safety Commission, cycling is the most dangerous athletic activity in America. Last year there were 446,878 hospital-treated injuries involving bikes, compared with 399,874 in baseball, 394,827 in football and 349,760 in basketball. Most states have laws requiring that a bike be equipped with a light or reflective material and a bell or horn, but enforcement is seldom strict.

The government report doesn't state how many of the cycling accidents involved motor vehicles, but it's clear that cars are not the only moving hazards a cyclist must beware of.

DOUBLE CLUTCH

continued from page 2

time we checked we were the cheapest per-copy of any major periodical in the Department of Defense. (Here we must thank the other Services because they buy large quantities of the press run and so help keep the unit cost down.)

Bring back Miss DRIVER – Sorry again. Although no one ever suggested the feature was not in good taste, our superiors decided that it did not meet a strict interpretation of our printing regulations. Also, our mail showed it was offensive to a few readers who felt it was sexist. You will see THE DRIVERS occasionally, with photos of both men and women, but Miss D. is gone forever.

Amount of motorcycle coverage – People who aren't into motorcycling complain that we devote too much space to cycles. Accidents cost the military lost time and money. Motorcyclists have more accidents than drivers in proportion to their numbers, so they get proportionately more space in this, an accident-prevention publication.

Personal copies delivered to home addresses – Many people have personal subscriptions to DRIVER which are handled by GPO (Government Printing Office). You will find the price and other details in the small print on page 2 of every issue. Frankly, it seems a bit extravagant for an active-duty person to pay for something he gets free. But you may certainly subscribe if you wish. If the cost seems high, remember that GPO incurs considerable expense in handling, maintaining address lists, furnishing envelopes, and providing postage. Civilian publications help defray subscribers' costs by selling advertising. A government publication of course has no advertisers.

Road tests and product comparisons – Even if we had a staff large enough to do such things, it is really outside our charter. We can and do tell you when problems have been reported in vehicles or recalls ordered. But it isn't our business to tell you we think one tire or screwdriver is better than another. The Tech Editor recently started a series on how to be a smart consumer of services and goods. Hope you like it.

If you have a yellow survey card and haven't returned it yet, please do.

HOW IT HAPPENS!

One Sunday afternoon a group of young airmen stationed at a desert base drove two vehicles to a dry lake bed about 30 miles away. There they began making precision maneuvers in the vehicles. Upon reaching a pre-determined rejoint point, the vehicles were to make 90° turns and race parallel to each other. On one such run, the turns were not made and the vehicles collided at a high rate of speed. A game something like this was called "Playing chicken" when it was popular in the fifties.

Eight of the airmen were injured and one of them, who was sitting in the rear of a pickup with his back braced against the cab, suffered permanent total disability. Other injuries ranged from fractured jaws and fractured skulls to facial and head lacerations.

Q: If you ever catch yourself even thinking of playing the chicken game, you should:

a. take a cold shower;

b. watch a "Happy Days" re-run on TV;

c. sign up for disco lessons;

d. start an argument with the meanest chief master sergeant you can find.

A: Any of these is better than getting involved in childish play with vehicles. If an average driver were to pay the price of this one accident, it would take every cent he could earn between now and 1993. For the airman with the permanent total disability, the financial cost is the least of it.

coping with INEXPERIENCE

It's as easy as one, two, three, go; provided you don't skip from zero to go

So you're thinking about buying your first motorcycle, or perhaps you already have. All that's left to do is saddle up, crank it over and take off.

But hold on a minute, haven't you left something out?

If you said you have your helmet, protective clothing and eye protection, you're partially correct. However, there is a lot more to motorcycling than just jumping on and going.

You may say that if you can drive a car then a motorcycle is no sweat. You're wrong. And to coin an old phrase, you could be "dead wrong."

About the only similarity between driving a car and a motorcycle is the road used. And to back the difference up, more and more states are requiring special motorcycle license endorsements.

So where is the *proper* place to start? In the classroom of course.

In two-wheel schools you'll not only learn the proper way to do things, but you'll find others who are interested in the same things you are—motorcycles.

In case you think the turkey writing this is pulling your leg about motorcycle schools, or that schools will be harder to find than snow in July, think again.

Before Air Force military personnel can operate motorcycles on Air Force bases they must complete Course VII, Motorcycle Challenges. So, right away, that opens at least one bike classroom.

And that's only one of many. The Motorcycle Safety Foundation and the Kawasaki Learn to Ride courses are offered in local towns by high schools and colleges, and you'll find the two-wheel school-hunting good to excellent.

Now before you start mumbling about classrooms having little to do with seat-of-the-pants experience, check the schedule out carefully. For the most part, all the classes mentioned include actual hands-on time.

Now, with the schooling and licensing formalities out of the way, you're ready to tear up the world, right? WRONG again, buck-oh!

If you're smart enough to realize the value of the schooling and recognize the need for hands-on experience, then you are probably already a step ahead. That step being the need for experienced help and advice during those first crusial miles.

Believe it or not, every new rider needs to have someone to be their "Big Brother/Sister" at first. Someone to trust for straight talk. Someone to learn the smooth, professional way of riding from.

This someone isn't a cycle jock who's been around the block twice. And it really can't be someone you just talk or listen to. It has to be someone who can honestly bad-mouth the unsafe, yet play up motorcycling as a *great way to travel.* Someone who can introduce you around to other cyclists as well as places to or not to shop for *your* bike, parts and service. Someone who will go with you when you go to pick up *your* wheels.

If you haven't already figured out where to find this someone, may I suggest you go back to the paragraphs on schooling. That's where you'll more than likely find your "Big Brother/Sister" also.

Throughout the schools and probably straight from your "Big Brother/Sister" you are going to continue to hear certain do's and don'ts over and over again. So you might as well start learning them now.

If the urge to join the others who are cycling is becoming stronger than you can resist, perhaps you should listen up.

Some of the more common ones are:

■ **"Neither a borrower nor a lender be."** Loaning a bike to someone else is one of the fastest ways to wind up with an unusable pile of scrap aluminum, fiberglass, and rubber. The same holds true for borrowing a bike, but in this case, add to the list of scrap: Body, one each. The body being yours, of course.

■ **Steer left to go right.** At speeds of more than 10 mph, you've got to get the bike leaning in order to get it to go in any direction other than straight. This phenomenon is called "out-tracking," and a simplified description of out-tracking is that in order for a bike to turn, it must be leaning. To turn left a bike has to lean left. However, to get the bike to lean left, the bars must be turned to the right. This causes centrifugal force to throw the bike into a left lean, thereby causing a left turn. If you still doubt what we say, take a look at Air Force film AVA 001, ARE YOU READY?, starring Prof. Harry Hurt.

■ **The front brakes do most of the work.** And provide most of the stopping power too, about 70 percent as a matter of fact. The old drill still applies . . . hit the back brake first, then the front brake a fraction of a second later. Keep both brakes just short of locking

continued

Most motorcycle classes include actual hands-on experience.

And one of the side benefits of bike classes as well as finding a "Big Brother/Sister" is meeting others with the same interests, as these Navy personnel discover.

continued

up to achieve maximum stopping power. This takes practice, but stopping your cycle is probably the most important skill you can develop.

■ **Take railroad tracks at as direct an angle as possible.** Don't hit tracks at a slant. There are spaces next to the rails that can grab a relatively skinny cycle tire. If the tracks cross the road at an angle, swing out a bit and T-bone the rails.

■ **Daily maintenance and pre-ride checks are important.** We've included a chart here to tell you what to check, but remember, when we say "daily," we mean every riding day, or about every eight hours of operation.

(left)
"Big Brother/Sister" will not only reinforce the do's and don'ts of motorcycling, he or she will follow them religiously.

MOTORCYCLE SAFETY INSPECTION

ITEMS CHECKED		DEFECTS		SAFE	UNSAFE
BRAKES	REMOVED	POOR ADJ.	DISCONNECTED		
CONTROL LEVERS	BROKEN	BENT	NONE		
STEERING	EXTENDED FORKS	ANGLE CHANGED	BEARINGS LOOSE OR WORN		
FOOT RESTS	TOO HIGH	LOOSE			
HORN	NONE	NOT AUDIBLE			
MIRRORS	NONE	DEFECTIVE	NO SIDE VISION		
MUFFLER	NONE	NOISY	LEAKY		
HANDLEBARS	HIGH	LOOSE	BENT		
TIRES	FRONT REAR UNEVEN WEAR	CORD	SMOOTH		
HEAD LIGHTS	HIGH 1 OUT LOW	2 OUT	BAD FOCUS		
SEAT	HIGH	LOW	LOOSE		
TAIL LIGHTS	NONE	1 OUT			
LICENSE LIGHTS	NONE	1 OUT			
STOP LIGHTS	NONE	1 OUT	LENS		
CHAIN/SPROCKETS	LOOSE	TIGHT	WORN		
CABLES	WORN	STIFF	BROKEN		
WHEELS	OUT OF ALIGNMENT	IMPROPERLY SECURED	BROKEN, BENT OR LOOSE SPOKES		
SUSPENSION	IMPROPERLY MODIFIED	BENT/WORN LEAKING FLUID	BROKEN/MISSING COMPONENTS		
FUEL SYSTEM	IMPROPERLY SECURED	LOOSE FITTINGS	LEAKS		
THROTTLE	BINDING	BROKEN			
ENGINE KILL SWITCH	INOPERATIVE	MISSING			
SISSY BAR	LOOSE	NOT PROPERLY SECURED			
CLUTCH	DRAGGING	SLIPPING			
FRAME	BENT/DAMAGED	CRACKED			

RIDING EQUIPMENT

HELMET	UNAPPROVED TYPE	WORN STRAP SECURING DEVICE	IMPROPERLY MODIFIED
EYE PROTECTION	NON SHATTERPROOF	SCRATCHED/BLURRED EYE PIECES	INSUFFICIENT EYE COVERING

OTHER: CURRENT STATE INSPECTION STICKER

INSPECTED BY:

SUGGESTED DAILY/WEEKLY MOTORCYCLE INSPECTION

COMPONENT	CONDITION TO CHECK		DAILY	WEEKLY
TIRES	PRESSURE	WORN FOREIGN OBJECT		X
WHEELS	BENT DENTED MISALIGNED	SPOKES LOOSE/BROKEN		X
BRAKES	ADJUSTMENT	OPERATION		X
SUSPENSION	BROKEN, WORN BENT	LEAKING FLUID		X
HEADLIGHT	OPERATION	ADJUSTMENT		
TAIL, BRAKE & SIGNAL LIGHTS	OPERATIONAL	ADJUSTMENT		
FUEL SUPPLY				
OIL SUPPLY				
ALL NUTS AND BOLTS				X
MIRROR	LOOSE	ADJUSTMENT	X	
HORN		OPERATION	X	
CHAIN	WEAR AND TENSION	LUBRICATION	X	
CABLES	WEAR AND ADJUSTMENT	LUBRICATION	X	
CONTROL LEVERS	ADJUSTMENT	OPERATION	X	
SEAT, WINDSHIELD GAS TANK	PROPERLY SECURED	ADJUSTMENT	X	X
FUEL FILTER	CLEANLINESS	TIGHTNESS		X
SWING ARM	BUSHING WEAR	LUBRICATION		X
ENGINE TRANSMISSION	OIL LEVEL	OIL LEAKS	X	
SPARK PLUGS	CONDITION	PROPER GAP		X
IGNITION POINTS	CONDITION	PROPER GAP		X
WIRING	FRAYED	LOOSE CONNECTIONS		X
SPROCKETS	WEAR	ALIGNMENT		X
BATTERY	CONNECTIONS	WATER LEVEL		X

■ **Use neutral while at stoplights.** If you leave the machine in gear while waiting for the light to change, there is a distinct possibility that the clutch cable may snap, causing you to squirt into cross traffic. This is very hard on your bike *and* your body.

■ **Don't ride "two-up" until you're very experienced.** You've got enough problems trying to learn to ride safely while responsible for only yourself. Don't try to take on the added responsibility of a passenger until you know what's involved. There are lots of things to re-learn about riding two-up, like increased tire pressures, harder shock settings, increased stopping distance, and higher effects of centrifugal force in turns.

■ **Use protective clothing.** We've said it before, many times, and we'll keep saying it. Protective clothing is the *only* way to lessen the effects of most injuries.

■ **Watch for gravel or water in the roadway.** And especially at the entrance to a curve. Gravel on paved surfaces makes you feel like you're trying to ride on marbles. Not fun. And water on a road surface can be slicker than . . . well, it can really be slick.

■ **Be wary of crosswinds.** Crosswinds can be caused by large trucks as well as trains, buses, etc. Also watch out when you enter or leave a grove of trees or a group of buildings. They stop wind pretty effectively and can leave you leaning in a direction you don't really want to be leaning in.

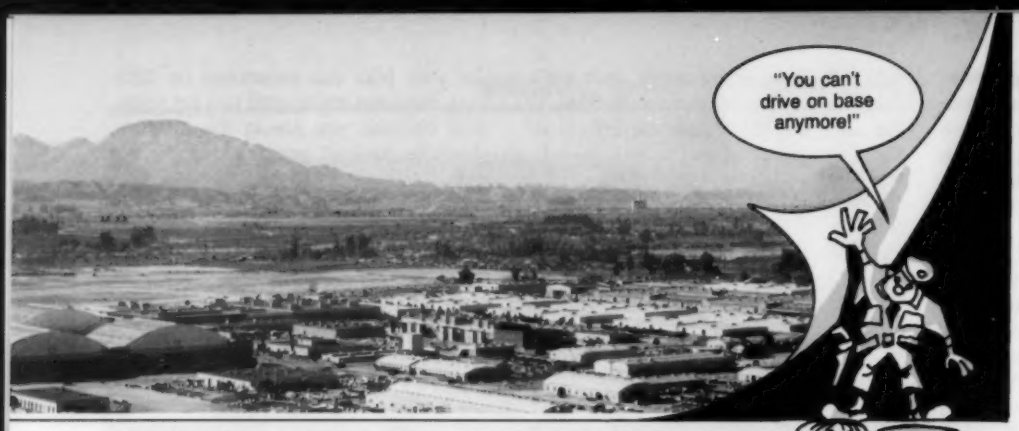
■ **Get insurance.** Buying insurance for your bike can sometimes be difficult, but keep trying until you get some. Just because you are in the military, don't be mislead into thinking the Air Force will pick up the tab for your medical bills. There is a little Catch-22 called a line-of-duty determination. If this determination were to go against you, the medical bills could be *your* responsibility.

■ **Keep the shiny side up and the rubber side down.** Don't "lay the bike down" . . . When you throw the bike away, you're also throwing away any hopes you may have had about maintaining control of the situation. If you keep the bike upright and stay on the brakes, you decelerate a whole lot faster than you will if you and the bike are sliding along the pavement.

Chains are one of the many items that require daily checks.

(left)
Those gaping edges between the pavement and railroad tracks can spell disaster for cyclists who don't approach crossings at direct angles—as this foolish operator may all too soon find out. Ouch!

(below)
Water on the road can result in the violation of another rule: Keep the shiny side up and the rubber side down.



BYE, BYE DRIVING

If you or someone you know has ever had your installation driving privileges suspended or revoked, the chill of those words rings too true. However, if you've escaped this terror, you might want to think about what would happen if the law were laid down to *you*.

For example, how would you get to work? To the Exchange? To chow? To the theater? Off base?

Many people are angered by those words. Furthermore, they feel their rights have been violated. Especially after paying a fine to state or local authorities.

by AL THOMAS Air Force Office of Security Police

It's called the Air Force Motor Vehicle Suspension Program – and it won't improve your riding comfort one bit. It seeks safe and efficient motor vehicle traffic movement. Its goal is reducing traffic accidents as well as the deaths, injuries and property damage that result.

Administration of the program is standardized for the military services and Defense Logistics Agency. The Department of Transportation's Highway Safety Program Standards provide the pattern.

Courts have traditionally looked upon driving a motor vehicle as a privilege. On base, this privilege is granted by the installation commander and is conditional: When certain conditions are ignored, the driver faces suspension or revocation action.

Suspension or revocation supports traffic safety goals by providing a deterrent to violations of the traffic code. Failing deterrence, these actions remove unsafe drivers from the roads while driver improvement is pursued.

Lifting on-base driving privileges for less than six months is suspension; more than six months is revocation.

Suspensions normally happen when counseling, remedial driver training or rehabilitation programs have failed. Repeated non-moving violations can also bring suspensions.

On the other hand, revocation is a severe administrative measure imposed for serious moving violations or when other corrective measures have failed. Revocation is mandatory for those individuals found driving while under the influence of alcohol or who fail to submit to a chemical test for alcohol.

If a person's license has been suspended by the state, that suspension also applies on base.

Driving on the installation while under suspension or revocation of privileges can mean at least a two-year revocation.

When driving privileges are suspended or revoked, vehicle registration is also terminated and the decal is removed.

Instead of total suspension or revocation, a commander may limit driving privileges. For example, the *man* could limit the individual to driving to and from work or between specified on-base facilities. Severe family hardship, mission impact or favorable influence of alcohol/drug treatment are conditions weighed by the commander when imposing restrictions. But the restricted driving option for hardships or mission impact is rarely used because alternative transportaion is normally available.

To evaluate driver performance impartially and uniformly the traffic points system is used. The points system applies to both civilian and military personnel. Traffic points accumulations are used as a basis for driver improvement actions such as counseling, medical evaluation, remedial driver training, and in some cases, even suspension/revocation action.

Points are assessed for moving traffic violations. Unit commanders, civilian supervisors, military and civilian courts may all find the driver guilty of an offense. Even paying a fine or forfeiting bail will result in points assessment.

Accumulating 12 points within 12 consecutive months or 18 points within 24 consecutive months will result in withdrawal of driving privileges. However, the commander may still suspend base driving privileges without regard to point assessment when he believes there is just cause – such as serious driving violations.

Non-moving violation policies are generally established at individual installations. Points aren't assessed for such violations, but consistent non-moving violations may result in an on-base suspension.

States and military installations normally report

IMPLIED CONSENT

Anyone operating a motor vehicle on a military installation is considered to have given consent to a chemical test of their blood, breath or urine to determine alcohol content. Refusing to submit to or failing to complete a requested test leaves the individual facing a mandatory six-month revocation of driving privileges.

A lawyer doesn't have to be present when "implied consent" is invoked, or during the test itself.

Incidentally, "implied consent" is being expanded to include other drugs besides alcohol.

all moving violations and motor vehicle law infractions to each other. Under these reciprocal agreements, installation driving privileges are automatically terminated when state authorities suspend or revoke a person's license. Likewise, when on-base privileges are lifted, the appropriate state agency is notified. These actions may be carried over to military vehicles as well.

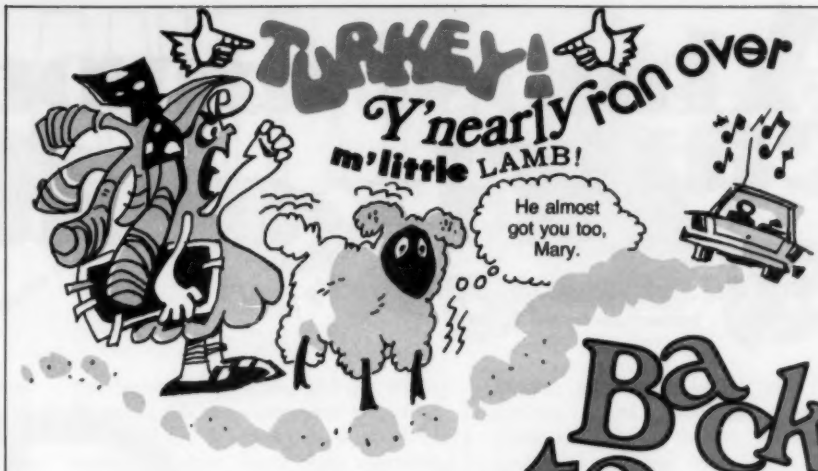
Those people facing such administrative action may still have a hearing. Suspension or revocation isn't effective until notice is received. If after receiving the written notice the individual applies for a hearing, the driving privilege action is delayed seven days. If a hearing isn't held within those seven days, the suspension or revocation won't take place until a hearing is granted and the person is informed of the results.

However, should the affected person request the hearing be continued beyond the seven-day period, the suspension or revocation begins with notice that the request has been granted.

If suspension or revocation is sustained by the commander, the driver has 10 days to appeal or request reconsideration. Meanwhile, the action remains in effect pending the outcome of the request.

The motor vehicle traffic program has been found to be legally sound. When administered according to the guidelines of Air Force Regulations 125-14 and 125-15 the person isn't placed in jeopardy twice for the same offense (civilian and/or military court).

The program is strictly "driver improvement oriented." If you have questions regarding installation driving privileges, discuss them with your security police.



Back to School

It's September. Perhaps you've noticed an occasional leaf hitting your windshield and thought about the coming of winter. There's another arrival you should remember at this time of year and that's school.

Children will be out on the sidewalks – and occasionally the streets – as they return to their schools after the summer break. Most of them know enough to stay in the crosswalks, but some of them are small and don't respect the power of automobiles as much as their older friends do. And some of them are just plain foolhardy; they like to get in the way and challenge you.

So watch for them as you drive to work on autumn mornings.

Almost anyone can fix a car

by Sgt R.T. EDWARDS, USA
Ft Campbell, KY

I know this sounds like an advertisement for a company that prints car manuals, but it's true . . . anyone can fix his or her own car. Fixing your own car can be an interesting adventure, and it can save you money to boot!

Once upon a time, I had a '55 Volkswagen. Now, this bug was great on gas, and got about 30 mpg. But even when the speed limit was 70, we raced along at 55 (if there was a tailwind). That car went through a lot, and it paid for itself (we got it for $150) in one trip from Lake Charles, Louisiana, to Fort Huachuca, Arizona.

Anyway, there's something about a car's load-carrying capability, and it's called "payload." I didn't know about payload. So when I loaded the V-dub up with about 450 extra pounds, it was kinda maxed out. The owner's manual, a yellow-gray piece of parchment, told about overloading, and what you would do to the transaxle if you overloaded it, but I couldn't read German.

Well, we took off toward Arizona with the little car grossly overloaded. It finally let me know it was overloaded as we took a small incline at the awesome speed of 10 mph. We made it to the new location, but that was as far as it went. It sounded like the engine was about to part company with the car, but it wasn't the engine, it was the transaxle.

What is a transaxle? It's a combination transmission/axle that bolts to the engine. Sometimes it's called the magic box because it's very complex in design (leave it to the Germans).

So, I needed wheels, and the car had to be fixed. The questions were: where, and for how much? No one wanted to touch the job for less than $300, and there was no way I was gonna pay that much. But I needed the car . . . what to do?

About that time, I mentioned the situation to a friend. He suggested that I do the work myself and get the part from a salvage yard for about $80. My wife heard about it and added, "Yeah, if you're such a hot-shot aircraft mechanic, why can't you do the job?"

Engaging my masculine ego, I thought "Yeah, why not?" I found a good used transaxle in a junk yard, and got it and the V-dub over to the automotive craft shop.

I had two problems right off. I didn't own any metric tools, and I couldn't find a shop manual (repair book) for the old car. I solved the first problem by simply purchasing the tools I needed, and the second problem was effectively solved by the friendly, knowledgeable people at the automotive craft shop.

Four bolts held the engine in the car, and two safety stands were required. The throttle linkage was removed, the electrical wires disconnected, and the engine was out . . . it was that simple.

It was a different matter with the transaxle. That took about a day to work out of the car, and another day to put back in. Then it was the engine's turn to be put back in place.

There were some snags, but they weren't insurmountable. In about three days' time, I had my car back on the road. My total cost was $120, and that included the tools which I kept and have used many times since. The car stayed on the road another couple of years and the transaxle paid for itself.

Well, what should this story mean to you? It should mean that almost anybody can work on a car. I'm not an expert mechanic, but I took enough time, and I wanted to learn. This learning ability is in all of us.

It's not "chic" these days to pay through the nose for car repairs, and that's why it's important to learn how to do some of your own car repairs. Not only will you be saving money, you'll be learning a new skill.

The wife? Well, she was flat-out amazed that I did the work myself, and she was very happy to find out that we saved money as well. As a matter of fact, she got so interested that she decided to learn to fix cars herself. At our installation, the automotive craft shop gives lessons to anyone who wants to learn about car repair, and those lessons are well worth the time.

A person armed with a little knowledge of cars will be able to spot a bum deal, and that's going to save everyone money . . . even you.

Think about it!

SOME ANSWERS for parents of:

About four million American teenagers will reach driver-licensing age this year, and most will begin to experience the pleasures and responsibilities of driving a car. If your teenager is going to drive, perhaps you've been asking yourself some questions about what sort of preparation your child ought to get. Maybe you've read some articles recently which claim that driver education in high school encourages 16-year-olds to drive sooner than they otherwise would and therefore contributes to the high number of traffic deaths among youngsters under 18.

The Highway Users Federation, with the help of the American Driver and Traffic Safety Education Association, has supplied answers to the following questions frequently asked about driver education.

1. Is driver education taught in every high school?

A. No. But it is taught in about 17,000 high schools around the country, four out of every five.

2. Is high school the best place to teach young drivers?

A. They can pay for private lessons offered by commercial driving schools, or, for better or worse, be taught by parents or friends. But in most cases, modern, well-equipped high schools offer the best combination of competent staff, administrative capacity, materials and facilities for quality courses. The public agrees. A recent survey found that three of four people think that high school is the best place to teach young people how to drive safely.

3. Couldn't I teach my children to drive as well as a professional instructor could?

A. Sure, if you are well-schooled in how to teach beginning drivers safe and fuel-efficient driving techniques, traffic laws, signs, signals and markings, motorist's responsibilities, vehicle handling characteristics, vehicle maintenance, hazard perception and decision-making skills, and are willing to put in the necessary time and effort. Remember, learning how to drive safely involves more than mastering the mechanics of operating a car. You may also have a bad driving habit or two that your child could pick up.

4. How much does high school driver education cost the public?

A. An average of $90 per student, which covers instructors' salaries, textbooks, films, cars, and other teaching equipment.

5. Where do they get the cars?

A. The majority are provided by local new car dealers at little or no cost to schools, students or taxpayers. During the 1977-78 school year, out of 44,780 motor vehicles used in high school driver education, more than 37,000 were dealer-owned.

6. Couldn't we save a lot of gasoline by abolishing these courses, or at least the practice driving involved?

A. On the contrary, abolishing driver education would actually increase our use of gasoline. Fuel-saving techniques which last a lifetime are taught in driver education. One study found that if all drivers practiced the fuel-saving measures taught in high school driver education, the country could achieve a ten percent reduction in gasoline use. Moreover, a parent teaching a youngster how to drive in the family car uses more gasoline than the instructor in the driver education car. All the high school driver education classes in the country consume less than two-hundredths of one percent of all highway fuel used in the country, a very small investment for saving lives and fuel.

7. Doesn't high school driver education encourage youngsters who might not otherwise drive to get a car?

A. No more than teaching home-economics encourages house-buying. Driver education is a "survival" course. Eight out of ten American adults are licensed drivers, and the percentage is growing. Most young people want to drive, and many need to for occupational or other reasons. Driver education teaches them how to do properly what they are likely to do anyway.

8. Does high school driver education pay off?

A. The evidence says yes. Youths who have completed driver education courses are cited for fewer moving violations and are involved in fewer accidents than those without instruction. That's why many insurance companies offer reduced premiums to driver education graduates. In many states, 16 or 17 year-olds cannot get a regular drivers license unless they complete a driver education course.

9. How are these classes organized?

A. In most schools, classes begin in the tenth grade. They are a combination of classroom and laboratory instruction. In the classroom, textbooks and other materials are used to supplement lectures, study, and discussions as with any academic subject. The laboratory part is "practice driving," in which the student gains actual driving experience under the guidance of the instructor. Some schools also use driving simulators in the classroom for additional "life-like" experience.

10. How can I help my teenager become a better driver?

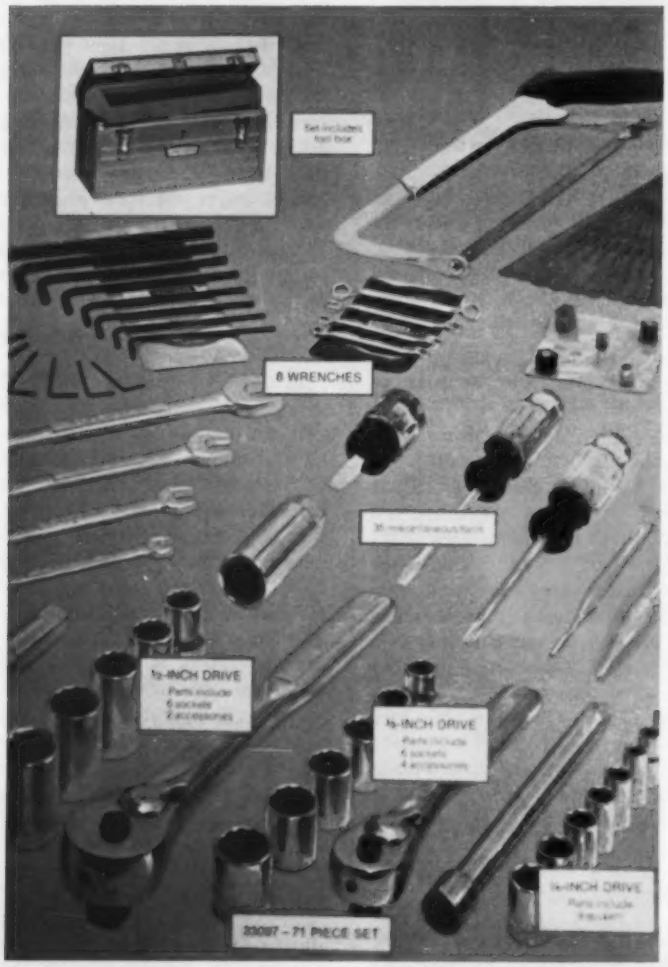
A. Insist on a quality driver education course taught by qualified instructors using up-to-date materials and equipment. You can set a good example, particularly in driving courtesy and attitude. And you can supplement your child's practice driving by allowing him or her to gain experience under your guidance in night driving, or under various weather and traffic conditions which might not be possible in the school's program.

Some people never seem to get the word . . . in this case, the word about jackstands (or safety stands, or ramps) and chocks. How 'bout it . . . would *you* work under this car?

There are a lot of good reasons for wanting to be a Backyard Mechanic. Maybe you're stationed at an installation that doesn't have an automotive hobby shop, or maybe you live too far away from the base to make the trip worthwhile on weekends. Maybe you're just starting out on the adventure of maintaining your own car, bike, or RV and want to learn at your own pace in the privacy of your own carport.

Or maybe you're tired of paying large amounts of money to a person who says he or she is a mechanic and then makes your car run worse than when you took it in.

Whatever the reason, the Backyard Mechanic is certainly one of DRIVER's more popular features. Perhaps you saw the readership survey card we put in a recent issue. We've received a lot of those cards back from our readers, and many of them tell us to keep the Backyard Mechanic simple and give



If you're feeling pretty flush, and you're sure you want to be a backyard mechanic, tool assortments like this one are available from major retail stores like Sears, Wards, and Penney's for between $50 and $85.

A good screwdriver assortment can cost from $10 to $20 and is one of your most important "first" purchases.

Tools

more basic info. Well, we're going to do just that. Beginning in this issue, you'll see an occasional BYM on the real basics of vehicle repair. Other issues will have the low-down on more advanced types of repairs, and still other issues will have the BYM slanted toward "consumerism," or how to avoid being ripped off on car repairs. We hope you approve . . . after all, you asked for it!

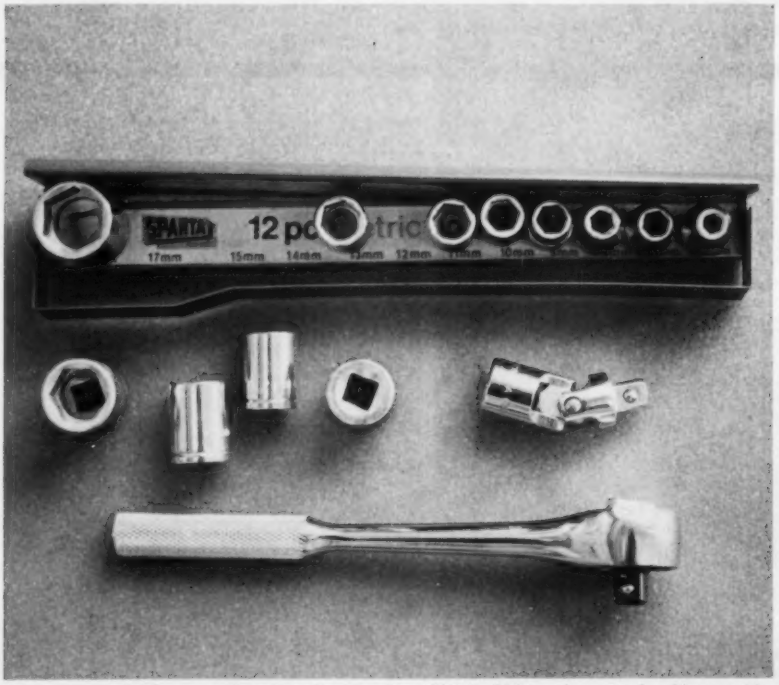
Backyard basics: With today's economy being what it is, this may be the perfect time to begin doing your own repair work. Most vehicle maintenance isn't difficult and requires only a little special knowledge and a modest investment in equipment. You can begin with small jobs done in your own carport or driveway. You'll have the satisfaction of doing your own work while saving a considerable amount of money. Who knows, you may even find you get emotional as well as financial satisfaction, and you may even *like* working on your car.

We've found that the backyard mechanic's most common mistake is getting into a job without the necessary tools, parts, and know-how. All of these items have been covered before, but we'll get into tools again with this issue, and you'll be seeing the other two items covered in the near future.

And even before we go into tools that you should have, let's take a minute out and briefly cover the home work area, something you'll need if you want to be a safe and efficient backyard mechanic.

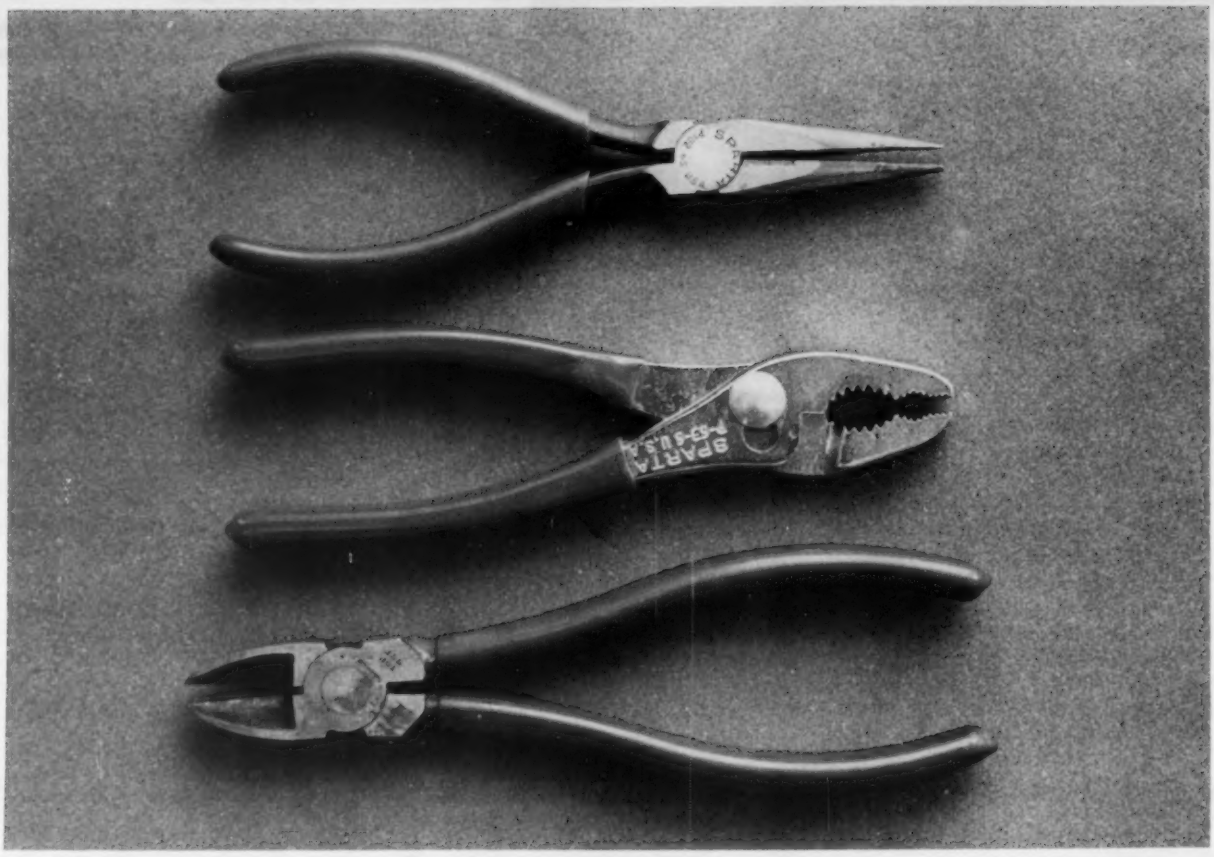
Your home work area can be a carport or closed garage, but even a paved, level driveway can be satisfactory. You *can* work on the bare ground, but you'll probably find that searching in

continued



A basic socket wrench set is inexpensive ($12 to $25) and comes in either metric, standard (SAE), or a combination of both.

Adjustable wrenches, also known as crescent wrenches (for the company that made them popular), are a valuable addition to your basic tool kit. The 6-, 8- and 10-inch sizes are the ones used most by backyard mechanics.



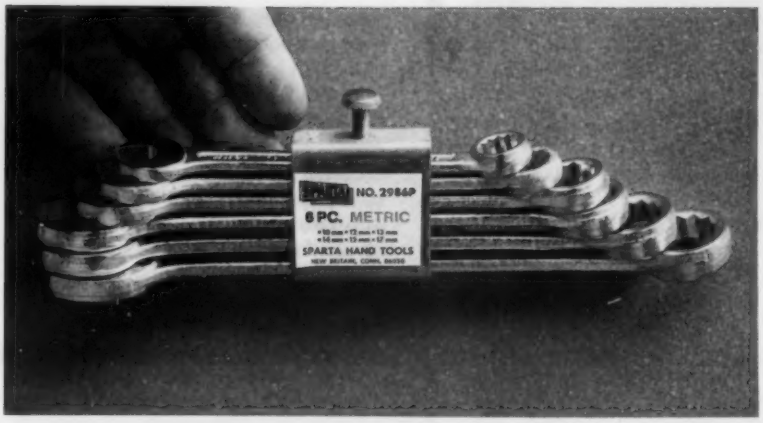
From the top: needle nose pliers, regular or mechanic's pliers, and dykes (used for cutting wire).

Feeler gauges are used to adjust ignition points and are not for use in gapping spark plugs. Spark plug gapping gauge properly measures plug gap, then adjusts it with built-in tool.

Hex key sets (also called allen wrenches) come in standard and metric sizes, are useful because many car makers now use hex-head bolts for a number of fastening jobs.

the backyard mechanic

continued



Wrench kits are part of your basic tool kit. There are combination box end/open end wrenches. Be sure you know what type (either metric or standard) nuts and bolts your vehicle has.

the dirt and dust for that dropped "frammispiece" is not *even* fun. If you've gotta work on bare ground, use a tarp, or pieces of cardboard, to form a clean work surface.

Adequate lighting and a workbench are two essentials of a proper work area. A UL- (Underwriters Lab) approved drop light, along with natural light and light from garage fixtures, should provide enough light to get you through the job. Drop lights (or trouble lights) are available at the Exchange or almost any parts store for less than $5.

A clean table or work bench should be used for laying out parts or manuals. A wide board placed across a couple of concrete blocks will serve as a bench if the spouse won't let you take the kitchen table outdoors.

Speaking of safety (and aren't we always!), one of the most important things you'll need in your home work area is a pair of safety stands, jack stands or ramps. Top quality jack stands are really pretty inexpensive if you buy them at the BX or local discount store. The ramps cost more initially, but are generally considered to be safer and easier to use.

Either ramps or stands are mandatory whenever you need to elevate a car to work on it. Bumper jacks, the kind that are supplied with the car, are for emergency use only and have no place in the maintenance scheme. It's also a good idea to keep a couple of wooden blocks or bricks handy to use as wheel chocks.

Another item you may wish to add to your home mechanic inventory is a creeper. Creepers are small boards equipped with wheels or casters. They allow you to lie down and move about under a car, and they provide a comfortable and easy way to work while under your car (which is, of course, on jackstands).

When you've established your working area, and you've got something to work *on*, you'll then need something to work *with*. Tools are a mechanic's best friends, and a good basic set is all that'll be required for most backyard mechanic work.

Basic tools: Many of you may already have most of the tools you'll need for routine mechanical work. For those just entering this field of endeavor, may we suggest that a basic tool kit

continued

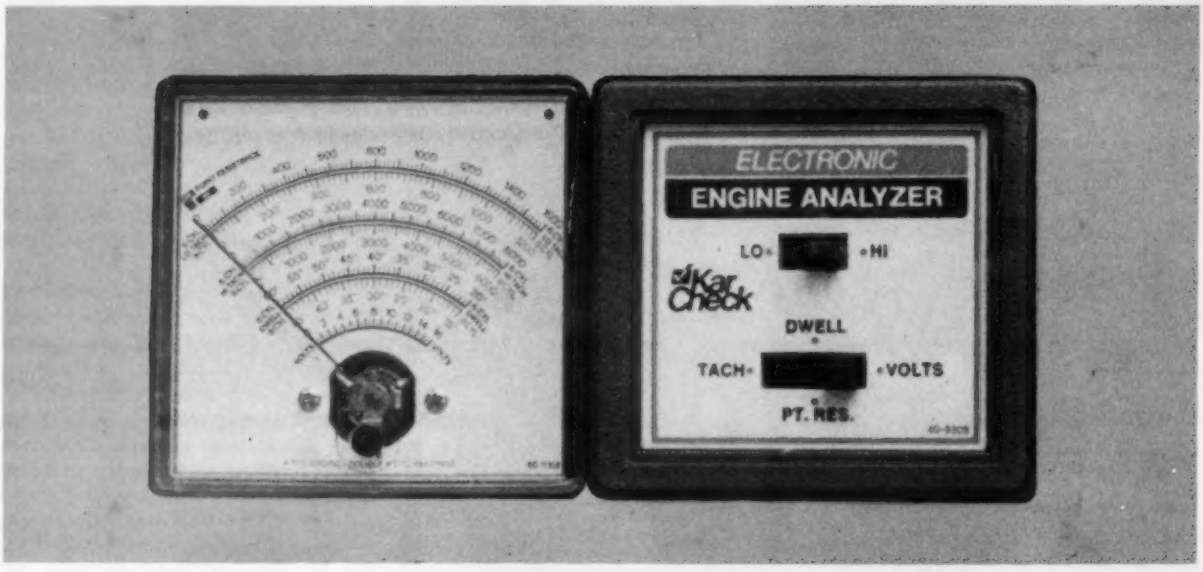
continued

should start with (but not necessarily be limited to) a set of open-end combination wrenches. Combination wrenches are those with an open-end fitting at one end and a box fitting at the other end and are probably the most versatile.

A set of ⅜-inch drive sockets and socket wrench, and possibly some smaller sockets in the ¼-inch size, should be sufficient. To these basic wrenches, you can add a medium (6- or 8-inch) crescent (adjustable) wrench. Assorted types and sizes of screwdrivers are essential, as are a pair of regular and needle-nose pliers. Round off your basic tool kit with a pair of vice-grip type pliers, a feeler gauge, a spark plug wrench, and perhaps a 12-volt test lamp. And a large rubber hammer would be nice at times.

Most popular discount and department stores often feature reasonably complete tool kits in the $25 to $60 range. These stores also may have frequent sales on individual tools you need or want, such as grease guns, special pliers, test equipment, drills, etc.

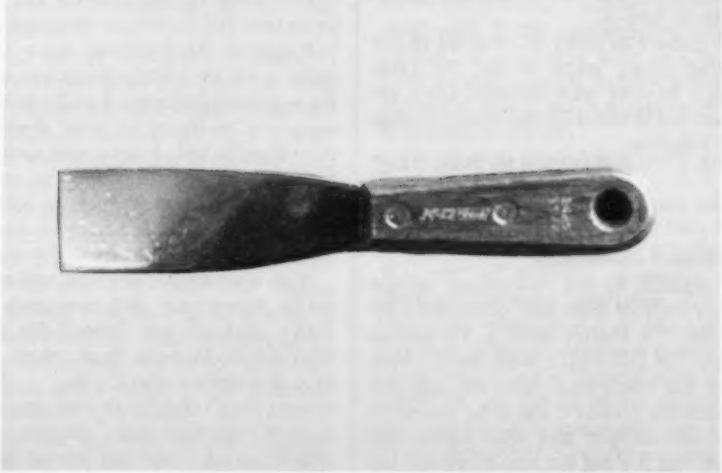
A good working area and basic tool set will allow you to perform most regular car maintenance jobs, but some common jobs may require special tools or equipment. These tools are often available at the base auto hobby shop or are for rent at tool rental places in town. Of course, by purchasing special items as you need them, you'll eventu-



Special purpose tools for one-time use can be rented at most tool rental outlets. Items like timing lights and tach/dwell meters should be a part of your own tool kit, if you can afford them.

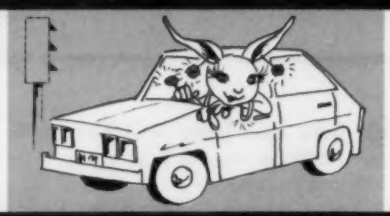
ally build up a home workshop that'll be almost as complete as many professional garages.

As we mentioned before, the Backyard Mechanic will be going into depth on some subjects, giving consumer tips on others, and getting back to basics in still other installments. Keep your eyes peeled for the issues that affect you and your situation. In no time at all, you'll find yourself looking for the more complicated ones!



BACKfire

LETTERS to the EDITOR



GOT IT TOGETHER

I've been reading DRIVER about five years, and in that time I've heard more arguing about helmets (whether or not to wear them) than I care to. I'm a rider too – my bike's small, just a 175 Yamaha Enduro (but I'm street legal) and I can only shake my head when I see a helmetless rider pass me doing way over 55. I wonder sometimes what he'd (I've yet to come across a girl riding sans helmet at that speed) look like if he hit rocks, got bounced off a car or just plain lost control. But, to you out there who feel that helmet laws are violating your rights, I still say you should have the right to die however you choose.

Me, hey, I've got a 9-year-old girl I want to see go to college and I don't want to look down and watch from a cloud so I wear a helmet. I may get skinned up, may even break a few bones, but somehow I keep hoping that that helmet I paid so much money for does its job. I know one thing – if my helmet isn't on my head – if it's strapped somewhere on my bike – then I definitely wasted my money, not to mention the possibility of wasting my life. Since I've been in this skin for nearly 30 years, I take every precaution I can to keep it.

I guess I'm lucky because all of my biking crowd seems to feel the same way I do – we wear helmets; life's too much fun to end it all that quick. Thanks for listening.

Sgt Dianne M. Broz, USAF
TTL/ACM
Luke AFB, AZ 85309

COMMON COURTESY

In regards to the newspaper article M.J. Twiford sent you, about the lady in the '74 Duster with a V8 engine (July '79 DRIVER), who knew which cars she could beat from the stop and which she couldn't: Let it be known to her and anyone else who thinks like that, that it's not the size of the car but what's *in it*! I drive a '76 VW Rabbit. If I approached her at a four-way stop sign . . . well, with what I've got in my engine and my experience in stunt and stock car driving, I'd dazzle her!

Common courtesy tells me to be a safe driver. Big things do come in small packages!

Your magazine is the best magazine a female can read. It's got a lot of good pointers. Keep up the good work.

Yellow Wabbit
Barksdale AFB, LA 71111

"OUTRAGEOUS CLOWNS"?

I've written you outrageous clowns before concerning your safety "Suggestions" and your opinion of those who ride bikes. It appears to me that you would rather have everyone drive a car to be safe to the fullest extent of possibility.

Now, we both know that (with care) walking is the safest way to travel. I know this to be true, I use this form of transportation with no or few gripes. I enjoy motorized transportation. Not because it is quicker, but because for me it is enjoyable. When I first received my big chance to hit the road legally I didn't waste any time. I've had cars, trucks, and bikes, but, *I* finally decided on a bike. *I* made a *choice*, which is hard to come by these days for one reason or another.

I've been in the military for four years now and have been watching your publication. Motorcycles have taken quite a bit of your publication in so far as printed pages go. I really do think what you're doing in your magazine is extremely bad. I have seen sarcastic feedback on tattoos since the article on that and related subjects to accident investigations. In fact, I was one of the people that responded to the article.

You tend to over-express and exaggerate safety gear and inaccurate statistics. Helmets are "cool" for those who decide to wear them where they have that choice. But I'll be . . . if you clowns didn't display in your magazine a set of "shoulder pads" for those who ride the road. That just proved to me that the guy who suggests these idiotic gadgets couldn't possibly know what he's talking about. If I were to take his advice and use shoulder pads in the middle of summer in Arizona I would be violating a safety point. Overheating. I would be dead in an hour with all that stuff on. Know this. I am forced by my office to read your magazine, but, after this I *will* be pencil whipping from now on. People that are that shortsighted can't be right.

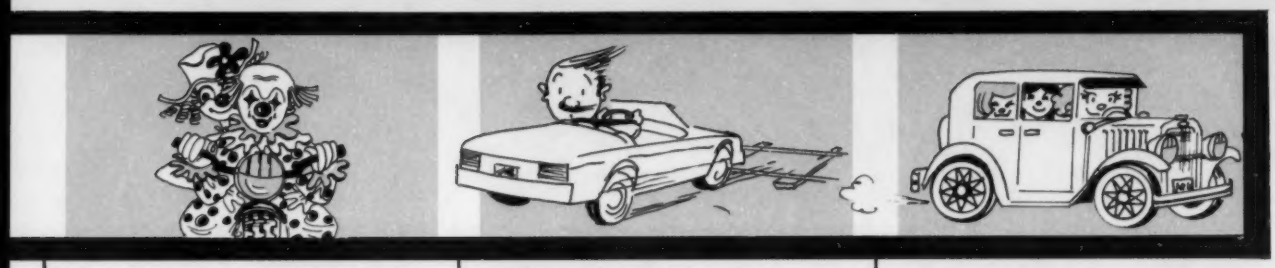
Sgt Phillip A. Pearson, USAF
7402 MUNSS Box 138
APO New York 09232

The shoulder pads were shown in a photo spread picturing new equipment on exhibition for dealers. No suggestion here that you go get some. They are for special riders. The tattoo comment refers to a published finding of Dr. Harry Hurt that victims of cycle accidents have more tattoos than their peers and so tattoos may indicate a risk-taking personality.

Our opinion of people who ride bikes is very high – we even let the Tech Editor eat lunch with us. It's your dig about our statistics that really hurts – those numbers we print from time to time may seem exaggerated to you, but they are accurate. People get killed NEEDLESSLY on motorcycles.

MOTORCYCLE SAFETY IN NAVY A JOKE?

Here in sunny Southern California (a biker's dream) at the 32nd Street Naval Station San Diego, a mandatory motorcycle safety course (20 hours in length) is in effect. In order to drive a motorcycle on base, you must complete the safety course. (Classroom and driving skills) But here's the problem: Even though this course is mandatory, the Navy can't seem to supply the instructors to teach it. There are plenty of MSF instructors around the area but most are attached to other commands, myself included. An additional problem is that there aren't any billets for an MSF instructor in the bureau to supply the instructors needed. So, between the commands, Naval Station Safety Office, COMNAVSURFPAC . . . etc. . . . instructors have been provided on a (usually 30 day) TAD assignment to the Safety Office, then



sent back to their own command. My own command sent me on verbal TAD orders for one month (due to the concern for lost time of personnel from motorcycle accidents). I was then extended for one month by message orders from COMCRUDESGRU ONE then sent back to my parent command. I have just returned from my annual leave, one week of which was spent instructing motorcycle safety at the Naval Station by request of the safety officer due to a shortage and possible cancellation of two classes for the week. I strongly believe in the safety program and was more than willing to help out. My main concern is why doesn't someone in Washington get off their duff and get some billets for motorcycle safety instructors in the Navy? Sure, commands would lose a man or woman for three days or so because they are at a school learning motorcycle safety, but to me, I would rather have one of my men in school for less than a week than possibly have him in Balboa Hospital for months or even worse.

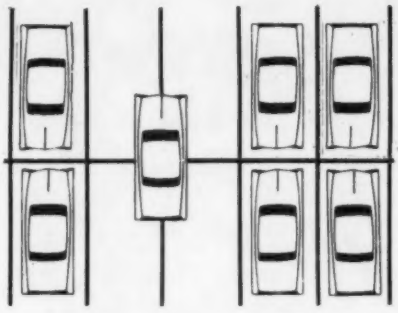
I don't have the whole story or know all the answers to the problem, but I know that the safety officer and the XO of 32nd Street Naval Station show a great concern for the program. I hope that from somewhere they do get the support that they so desperately need. They already have one of the best courses in the country (my own opinion). Now, someone please get them the qualified motorcycle safety instructor they need.

I want to thank DRIVER for the opportunity to let me get this little matter off my chest and also want to remind any reader out there who may be thinking about buying a motorcycle due to the gas crunch and price of gas, please get some type of certified motorcycle safety training before "hitting" the street. Don't learn mistakes from a "Buddy." The main idea is to keep the shiny side up and the rubber side down. Ride safe.

RM1 Richard A. Sloan, USN
4610 Beatty Place
San Diego, CA 92124

"SPARKING PLOTS"

"Sparking Plots" (June '79 DRIVER) hit the nail on the head but failed to mention my own unfavorite parker: the one who manages to kill off four



spaces with one car.

Makes me want to nail a few heads myself!

Wary (and Weary) of Parking Lots
HQ AFCS/IGF
Scott AFB, IL 62225

TRIVIA-NOSTALGIA

As an old car collector/restorer the Trivia-Nostalgia Test in the June '79 DRIVER proved interesting to me. The answer to question 17 regarding the V60 and V85 engines produced by Ford Motor Company during the 1930s is incorrect.

Ford Motor Company introduced the V8 engine in its Ford cars in 1932. This engine was a 221 cubic inch version that developed 65 bhp. Horsepower was increased to 75 bhp for 1933 and again in 1934 to 85 bhp. This engine became known as the "85." Ford produced a 136 cubic inch engine, as a sister to the 85, during the years 1937 to 1940. This 136 cubic inch engine was dubbed V60 by Ford, meaning it developed 60 bhp. The V60 was never a popular engine due to its poor performance when placed in the standard-size chassis. The engine did become popular for use by "midget" racing cars during the late '30s and '40s. Hope this info will help set the record straight.

Maj Jon D. Miller
USAARMC ARNG Advisor
Ft. Knox, KY 40121

DRIVING IN GERMANY

I've been driving in Germany for two years now. The German courts recently made some rulings which are of interest to personnel being posted here and also of general interest in the mandatory seat belt and helmet law controversy.

German courts recently ruled that if you are involved in an accident and failed to utilize seat belts, you have, in effect, failed to take all possible steps to minimize the severity of the accident. In such a case, insurance underwriters may not be obligated to reimburse you to the extent they would have to if you were wearing seat belts. This has a direct monetary influence on all U.S. drivers over here.

I personally feel that this is a valid argument and could be a workable solution to the present mandatory seat belt and helmet question. I personally feel that mandatory laws "for my own good" are not the way to go. I prefer to do my own thinking.

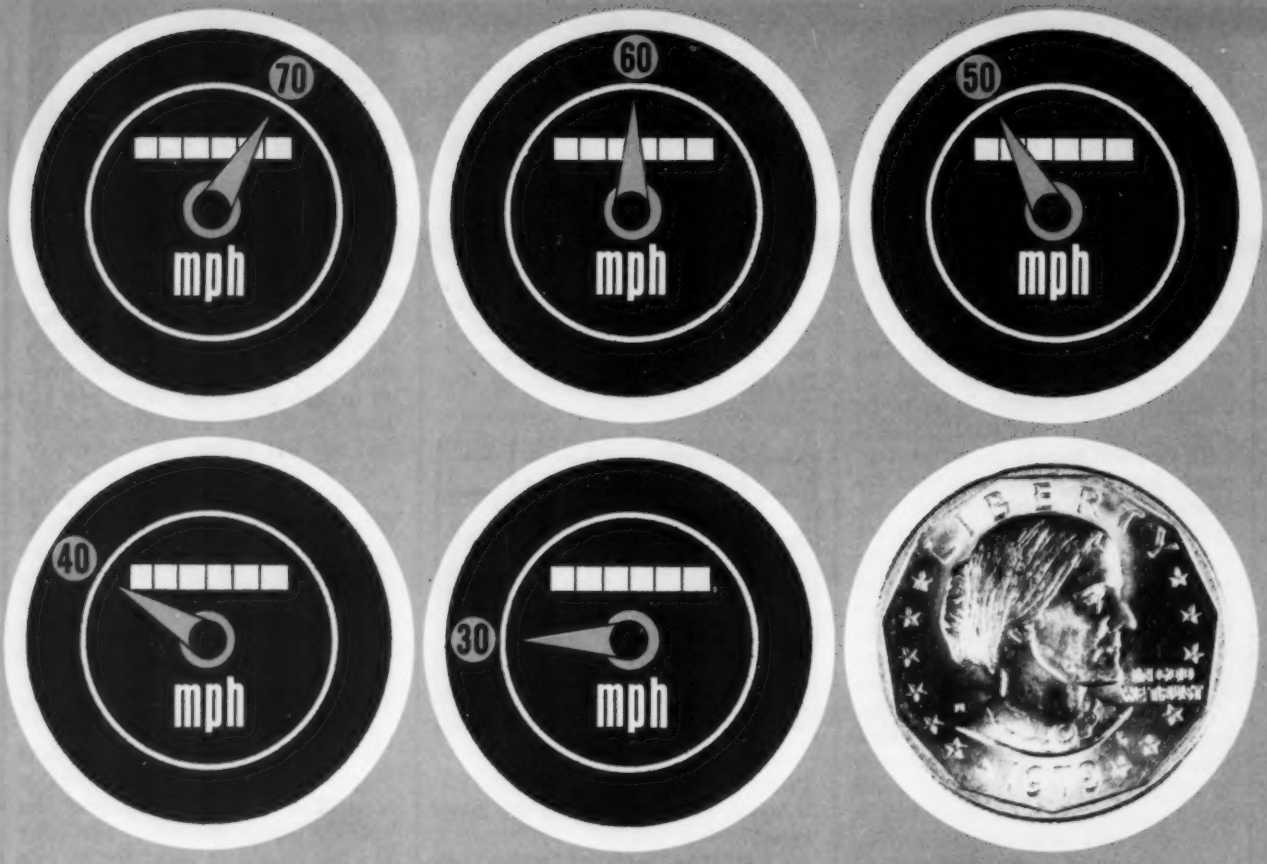
Also, reference your May '79 issue. In your article "A Pucker Factor Higher Than Seven," case number four has a car stalled on railroad tracks. I once read a suggestion to put the car in gear and use the starter motor to move the vehicle. I believe this would work only if the transmission were a manual. If you have time, it's worth a try. It won't do the battery or starter motor any good, but it would be better than totaling the car.

I think your magazine is really great. Keep up the good work.

1Lt Joe Yarrish, USAF
PSC Box 817
APO New York 09669

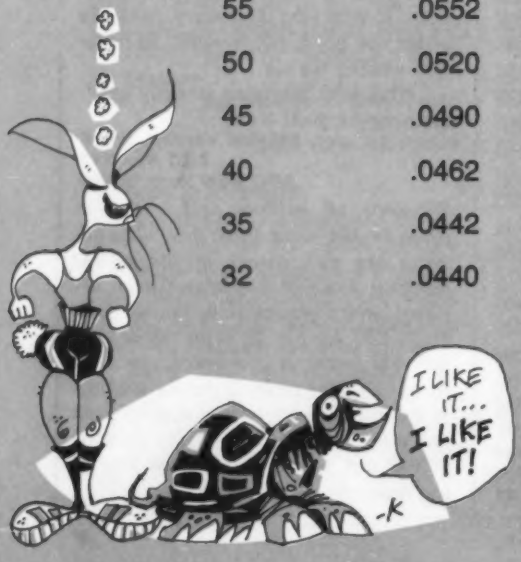
We hope all military personnel who drive in Germany (and their dependents) are now aware of the recent German Federal Supreme Court decision, which was explained in the June DRIVER. So far as being stalled on railroad tracks is concerned, we stick by our decision to leave the car and run in the direction the train is coming from (so you won't be hit by flying debris). If you can see the train, then time is too precious to experiment.

☆U.S. GOVERNMENT PRINTING OFFICE: 1979—683-012/11



What a reduction in speed means to the average driver.

Speed	Gallons per Mile	% Savings With A Speed Reduction From: 70	65	60	55	50	45	40
70	.0671	0						
65	.0630	6	0					
60	.0590	12	6	0				
55	.0552	18	12	6	0			
50	.0520	23	17	12	6	0		
45	.0490	27	22	17	11	6	0	
40	.0462	31	27	22	16	11	6	0
35	.0442	34	30	25	20	15	10	4
32	.0440	34	30	25	20	15	10	4



Example: If you have been driving 65 mph, a reduction to 55 will save 12 percent on fuel consumption and money spent for fuel. The figures were developed by California's Transportation Agency. Figures are average savings; some vehicles will achieve even more.